Properties of Synthetic Derivatives of Buckminsterfullerene in Composites with Conducting Polymers

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Published in:
International Conference on Science and Technology of Synthetic Metals, 1994. ICSM '94

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SELECTIVELY DEUTERATED MOLECULAR CONDUCTOR (DMe-DCNQI)$_2$Cu –PHASE DIAGRAM AND DIMENSIONALITY–

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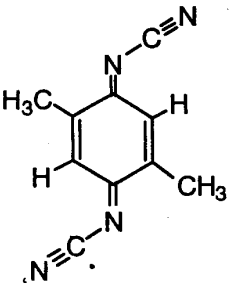
Conducting molecular system (R^1,R^2-DCNQI)$_2$Cu consists of one-dimensional DCNQI columns, each of which is three-dimensionally linked by the coordination bond (Cu—N). Pπ-d interaction in this system provides unique electrical and magnetic properties. (DMe-DCNQI)$_2$Cu undergoes novel metal-insulator-metal (reentrant) transition under very low-pressure. Based on the discovery of the deuteration-induced metal-insulator transition[1], we present fine tuning of the effective pressure (1-500 bar) by selective deuteration of the DMe-DCNQI molecule. Structural and electrical aspects of the phase transition in the selectively deuterated system (including alloy system) are described. We also report that three-dimensional Fermi surface observed in the de-Haas van Alphen effect[2] can be explained by a simple tight-binding band calculation.



DMe-DCNQI

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(1) S. Hünig et. al., *Angew. Chem. Int. Ed. Engl.*, **31**, 859 (1992).
(2) S. Uji et. al., this conference.

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PROPERTIES OF SYNTHETIC DERIVATIVES OF BUCKMINSTERFULLERENE IN COMPOSITES WITH CONDUCTING POLYMERS

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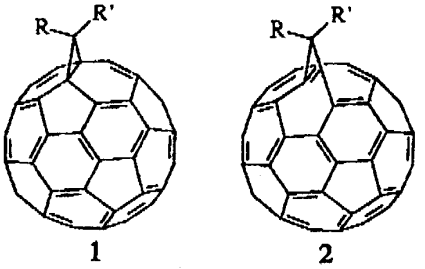
Studies of photoinduced electron transfer from a conducting polymer to C_{60} and C_{61} derivatives with 60 and 58 π electrons will be described. The molecules with 58 π electrons are the methanofullerenes; e.g., **1** and the molecules with 60 π electrons are the fulleroids (**2**). These molecules were made into composites with conjugated polymers such as MEH-PPV and the epi-cholestanoxy-PPV analogs. The photophysics of the various composites and the dramatic effect of electron count will be described. Other physicochemical phenomena related to fulleroid-methanofullerene isomerism will also be described.



1 **2**